Trend Tests

Eleven years of Behavioral Risk Factor Surveillance System (BRFSS) data (1989-1999) were analyzed using the BRFSS CD ROM. Rates for selected behaviors were calculated for Utah, for the Region which included Utah and the states bordering Utah (Arizona, Colorado, Idaho, Nevada, New Mexico, and Wyoming), and for the U.S. as a whole, which also included Utah. Standard errors were calculated using SUDAAN statistical software. The table on the last page of this Appendix A shows which states and territories participated in the survey in a given year. The states in the Region are highlighted.

When comparing the rates of behavioral risk factor data over time, one is often interested in the existence and nature of trends. Does the risk factor increase or decrease over time? Is the increase or decrease occurring at a constant rate? Does the risk factor increase or decrease over the entire eleven years? Orthogonal contrast coefficients were used in SUDAAN statistical software to formally test for linear and non-linear trends.

With the initiation of the rotating core in 1993, data was collected in unequally spaced time intervals. Orthogonal contrast coefficients were obtained by using SAS interactive matrix language (IML) software. The orthogonal coefficients took into account the unequally spaced time intervals and ensured that the linear and non-linear tests were independent; a significant linear trend did not influence the existence of non-linear trends. These coefficients were used in SUDAAN statistical software to calculate the statistical probability that linear and non-linear trends existed for each risk factor in the report.

A linear trend indicates that the risk factor increased or decreased at a constant rate over the time period. A non-linear trend indicates that the trend has changed over time. The increase or decrease may have occurred only for some of the eleven years or the rate of increase or decrease may have changed over the time period. For this report only linear, quadratic and cubic trends were considered. When the trend includes both significant linear and non-linear components, the data demonstrate certain non-linear variation (e.g., leveling off or change of direction) in addition to an overall linear trend.

Statistical Power

The statistical tests for trends are related to the size of the sample. The U.S. has a very large sample size over the period (1,223,413 records) in comparison to the region (143,391 records) and Utah (25,485 records). Accordingly, a much smaller change over time will result in a statistically significant trend for the United States than a similar change in the region or State. Computer simulation studies were performed to determine just how much change would be required for statistically significant trends to be observed.
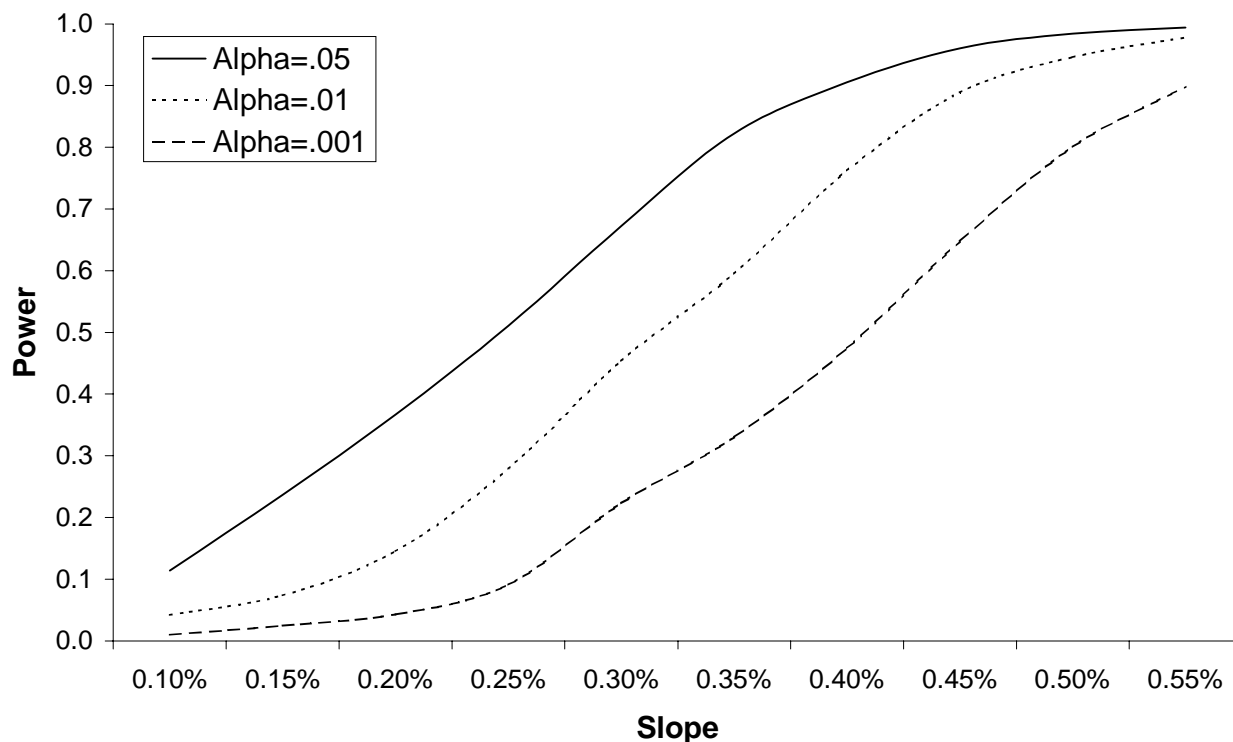
For the United States, it was found that a change of about .08% per year would result in a statistically significant linear trend about 90 percent of the time. For the region, a change of about .2% per year resulted in a statistically significant linear trend about 90 percent of the time. In Utah, a change of about .4% per year resulted in a statistically significant linear trend around 90 percent of the time. Power graphs were prepared from the simulations and are included in the appendix. For the purposes of this report, an alpha of .05 was used to identify statistically significant trends.

Demographic Comparison Tests

Four years of BRFSS data (1996-1999) were combined in order to be able to test for differences in the responses for demographic groupings of age, race/ethnicity, annual household income, educational attainment, and sex. SUDAAN Proc Descript was used to formally test for differences within the demographic groupings. Differences between the nominal variables sex and race/ethnicity were tested using Pairwise or Contrast in SUDAAN Proc Descript. For the ordinal variables of age, income and education, if there appeared to be a linear relationship, SUDAAN Proc Descript Poly was used to test for a possible linear relationship.

Power for Linear Trend Test, Utah

Power for Linear Trend Test, Region

Utah's Behavioral Risk Factor Surveillance System Trend Report, Utah Department of Health
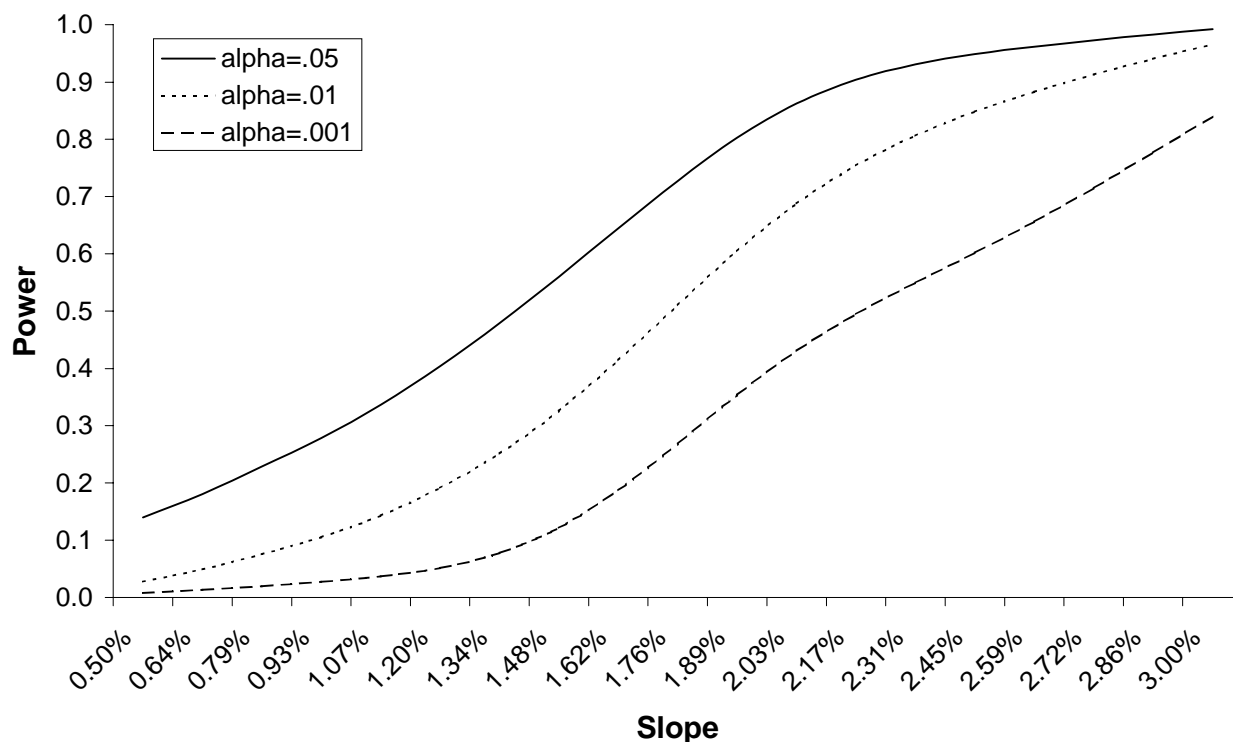
Power for Linear Trend Test, U.S.

States Participating in the BRFSS, 1989-1999

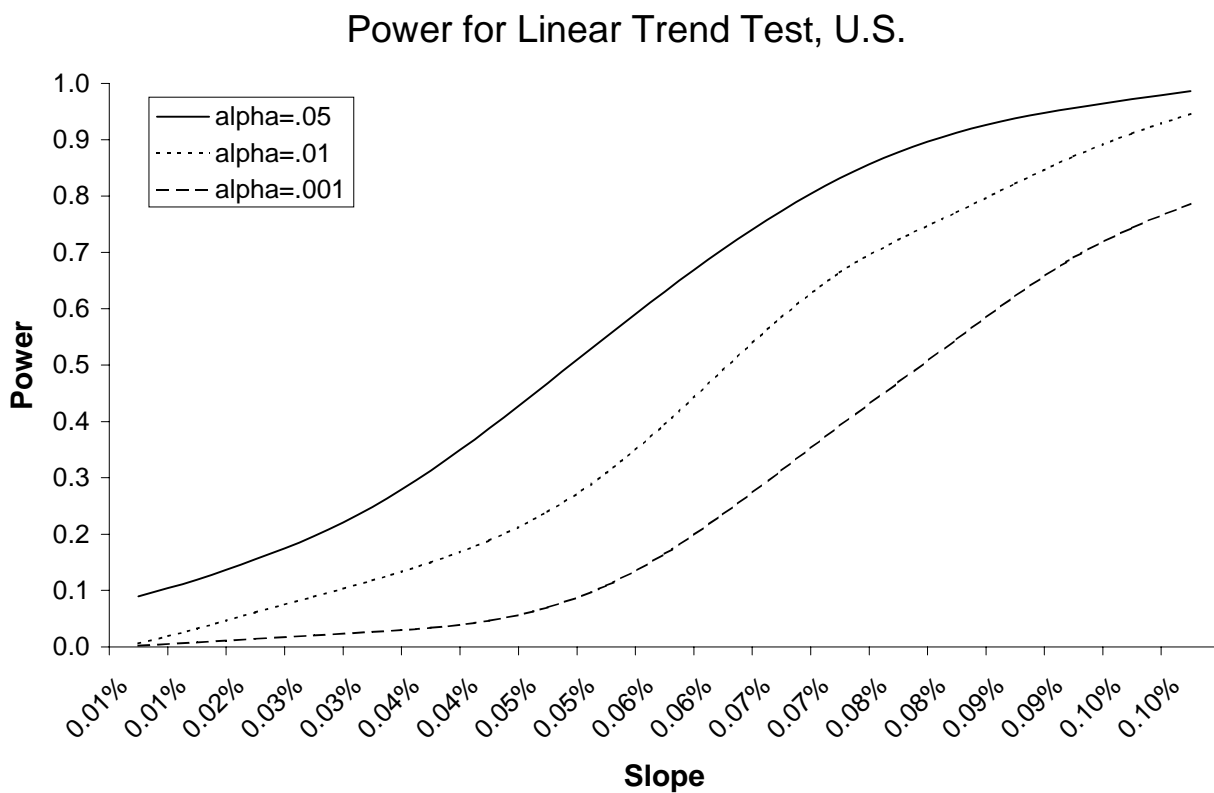| State	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Alabama	☎	☎	☎	☎	☎	☎	☎	☎	☎	☎	☎
Alaska			☎	☎	☎	☎	☎	☎	☎	☎	☎
Arizona	☎	☎	☎	☎	☎	☎	☎	☎	☎	☎	☎
Arkansas			☎		☎	☎	☎	☎	☎	☎	☎
California	☎	☎	☎	☎	☎	☎	☎	☎	☎	☎	☎
Colorado		☎	☎	☎	☎	☎	☎	☎	☎	☎	☎
Connecticut	☎	☎	☎	☎	☎	☎	☎	☎	☎	☎	☎
Delaware		☎	☎	☎	☎	☎	☎	☎	☎	☎	☎
Dist. Of Col.	☎	☎	☎	☎	☎	☎		☎	☎	☎	☎
Florida	☎	☎	☎	☎	☎	☎	☎	☎	☎	☎	☎
Georgia	☎	☎	☎	☎	☎	☎	☎	☎	☎	☎	☎
Guam											☎
Hawaii	☎	☎	☎	☎	☎	☎	☎	☎	☎	☎	☎
Idaho	☎	☎	☎	☎	☎	☎	☎	☎	☎	☎	☎
Illinois	☎	☎	☎	☎	☎	☎	☎	☎	☎	☎	☎
Indiana	☎	☎	☎	☎	☎	☎	☎	☎	☎	☎	☎
Iowa	☎	☎		☎	☎	☎	☎	☎	☎	☎	☎
Kansas				☎	☎	☎	☎	☎	☎	☎	☎
Kentucky	☎	☎	☎	☎	☎	☎	☎	☎	☎	☎	☎
Louisiana		☎	☎	☎	☎	☎	☎	☎	☎	☎	☎
Maine	☎	☎	☎	☎	☎	☎	☎	☎	☎	☎	☎
Maryland	☎	☎	☎	☎	☎	☎	☎	☎	☎	☎	☎
Massachusetts	☎	☎	☎	☎	☎	☎	☎	☎	☎	☎	☎
Michigan	☎	☎	☎	☎	☎	☎	☎	☎	☎	☎	☎
Minnesota	☎	☎	☎	☎	☎	☎	☎	☎	☎	☎	☎
Mississippi		☎	☎	☎	☎	☎	☎	☎	☎	☎	☎
Missouri	☎	☎	☎	☎	☎	☎	☎	☎	☎	☎	☎
Montana	☎	☎	☎	☎	☎	☎	☎	☎	☎	☎	☎
Nebraska	☎	☎	☎	☎	☎	☎	☎	☎	☎	☎	☎
Nevada				☎	☎	☎	☎	☎	☎	☎	☎
New Hampshire	☎	☎	☎	☎	☎	☎	☎	☎	☎	☎	☎
New Jersey			☎	☎	☎	☎	☎	☎	☎	☎	☎
New Mexico	☎	☎	☎	☎	☎	☎	☎	☎	☎	☎	☎
New York	☎	☎	☎	☎	☎	☎	☎	☎	☎	☎	☎
North Carolina	☎	☎	☎	☎	☎	☎	☎	☎	☎	☎	☎
North Dakota	☎	☎	☎	☎	☎	☎	☎	☎	☎	☎	☎
Ohio	☎	☎	☎	☎	☎	☎	☎	☎	☎	☎	☎
Oklahoma	☎	☎	☎	☎	☎	☎	☎	☎	☎	☎	☎
Oregon	☎	☎	☎	☎	☎	☎	☎	☎	☎	☎	☎
Pennsylvania	☎	☎	☎	☎	☎	☎	☎	☎	☎	☎	☎
Puerto Rico								☎	☎	☎	☎
Rhode Island	☎	☎	☎	☎	☎		☎	☎	☎	☎	☎
South Carolina	☎	☎	☎	☎	☎	☎	☎	☎	☎	☎	☎
South Dakota	☎	☎	☎	☎	☎	☎	☎	☎	☎	☎	☎
Tennessee	☎	☎	☎	☎	☎	☎	☎	☎	☎	☎	☎
Texas	☎	☎	☎	☎	☎	☎	☎	☎	☎	☎	☎
Utah	☎	☎	☎	☎	☎	☎	☎	☎	☎	☎	☎
Vermont		☎	☎	☎	☎	☎	☎	☎	☎	☎	☎
Virginia	☎	☎	☎	☎	☎	☎	☎	☎	☎	☎	☎
Washington	☎	☎	☎	☎	☎	☎	☎	☎	☎	☎	☎
West Virginia	☎	☎	☎	☎	☎	☎	☎	☎	☎	☎	☎
Wisconsin	☎	☎	☎	☎	☎	☎	☎	☎	☎	☎	☎
Wyoming						☎	☎	☎	☎	☎	☎

Highlighted states are included in "region."

Utah's Behavioral Risk Factor Surveillance System Trend Report, Utah Department of Health